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3<sup>x</sup> Reactions of  
**OAT VARIETIES**  
to Races of Loose<sup>1</sup> and Covered<sup>2</sup>  
**SMUTS**  
x + E3A

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REACTIONS OF OAT VARIETIES TO RACES OF  
LOOSE AND COVERED SMUTS <sup>1/</sup>

36 By C. S. <sup>2/</sup>Holton and H. C. <sup>2/</sup>Murphy

## INTRODUCTION

The planned and systematic incorporation of smut resistance in improved oat varieties is dependent on information concerning sources of resistance to representative components of the race population of the smut species. In 1948,<sup>3/</sup> 15 races of loose smut (Ustilago-avenae) and 7 races of covered smut (U. kolleri) were established as standard representatives of the race population for use in the development of improved oat varieties with a high degree of smut resistance. At that time the reactions of 47 varieties to these 22 smut races were given. Since then, an additional race of U. avenae has been found, and the reactions of 63 additional varieties to 23 standard smut races and 33 varieties to partial sets of the 23 races have been determined. The reactions of these 96 agronomic varieties and of 10 standard smut differential varieties to the races of loose and covered smut are presented here.

## PROCEDURE

All tests for the reaction of varieties to individual smut races were made in single-row field plots planted in the spring at Pullman, Wash. Seed of each variety tested was inoculated with a spore suspension of each race by the partial vacuum method of inoculation.<sup>3/</sup> The usual precaution of treating the seed with formaldehyde before inoculation to eliminate any possible existing natural contamination was omitted. There was no evidence in any of the tests that such contamination was a significant factor in any of the variety reactions obtained.

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<sup>1/</sup> Cooperative investigations of the Crops Research Division, Agricultural Research Service, U.S. Department of Agriculture, and the Washington Agricultural Experiment Station. Washington Agr. Expt. Sta. Scientific Paper 2808.

<sup>2/</sup> Plant Pathologists, Crops Research Division, Agricultural Research Service, U.S. Department of Agriculture; Pullman, Wash., and Beltsville, Md., respectively.

<sup>3/</sup> Holton, C. S., and H. A. Rodenhiser. 1948. Physiologic specialization in the oat smut fungi and its relation to breeding oats for smut resistance. U.S. Dept. Agr. Tech. Bul. 952, 16 pp.

The efficiency of the inoculation method and the seasonal influence on infection were measured by the degree of infection on check varieties of known reactions. By this standard, the results indicated that all of the tests were made under highly favorable conditions for smut development, and, therefore, the data obtained are regarded as a valid measure of the reactions of the varieties in this environment.

The incidence of smut was recorded as percentage of total panicles in each row. These percentages were determined by actual count, except that estimates were made in rows in which the smutted panicles were obviously in the majority. All rows had a full stand of plants, and the number of panicles ranged from less than a hundred to several hundred, depending on the variety and the season.

## RESULTS

A list of the 10 differential and 96 agronomic varieties is presented in table 1. A double asterisk after the C.I. number in table 1 indicates an immune reaction to all 23 races; whereas a single asterisk indicates an immune reaction to all races tested, but less than 23.

The percentages of smut produced on each variety by individual races are recorded in table 2. If we consider 0 infection as immunity, trace to 5 percent infection as highly resistant, 6 to 10 percent infection as resistant, and 11 to 100 percent infection as susceptible, the varieties can be grouped roughly into those that are immune to all races (\*\*); immune to incomplete sets of races (\*); immune or highly resistant to all races tested; immune, highly resistant, or resistant to some races, and susceptible to others; and susceptible to all races tested.

It is encouraging that half (53) of the 106 varieties tested were immune, highly resistant, or resistant to all races with which they were tested. Thirty of these were free from infection to all races tested, with 19 being apparently immune to the full set of 23 races. Approximately half (53) of the varieties tested had mixed reactions of susceptibility to some races and some degree of resistance to other races. Only one variety (AuSable) was susceptible to all races with which it was tested.

The differential variety Anthony was highly susceptible to all of the Kolleri races and to most of the Avenae races. Ransom was susceptible to all of the Avenae races except "576," and resistant to all of the Kolleri races. A number of agronomic varieties exhibited differential reactions to the individual races.

The recent "explosive" increase of the recently identified Avenae "576" race of smut in Iowa, Illinois, and other North Central States illustrates the necessity of continued race surveys and breeding for

resistance to all races. The data presented in table 2 indicate a wealth of resistance to "576" and other individual races of smut, and it should be relatively simple to select parents for numerous crosses that would afford an opportunity to select for additional combined immunity or high resistance to all 23 races. Thus, unless or until new pathogenic races of oat smuts develop, there is ample potential for the development of smut resistant varieties for all areas of adaptation.



Table 1. Varieties of oats tested for resistance to 23 pathogenic races of oat smut at Pullman, Wash., in the period 1950-63

C.I. No. 1/	Name	Parentage or history	Source and/or selection number
<u>Differential varieties:</u>			
2143	Anthony	White Tartar x Victory	Minn. 686
4599	Atlantic	(Lee x Victoria) x Fulwin	USDA 5293
1878	Black Diamond	Probably introduced from France	France
1877	Black Mesdag	Introduced from France	France
2965	Camas	Markton x Victory	USDA-Idaho 31-6404
6701	Clintonland	Clinton <sup>4</sup> x Landhafer	Purdue B4916A3-4
708	Fulghum	Selection from Red Rustproof	Farmer selection
1898	Gothland	Introduced from Sweden	Sweden
1876	Monarch	Introduced from Europe	Europe
560	Victory	Selection from Milton	Sweden
<u>Agronomic varieties:</u>			
5371	Alamo	[Victoria x (Hajira x Banner)] x (Fulghum x Vtra)	Tex. 73-44-90
4170	Andrew	Bond x Rainbow	Minn. II-33-21
5967	--	Andrew x Clinton	USDA-Idaho 48-4537
4657	Arlington	(Lee x Victoria) x Fulwin	Belts. 5288
7670	AuSable	[(Beaver-Garry x Clinton) x Clinton] x Minor	Mich. 56-22-1417
5346	Basin	Clinton x Overland	USDA-Idaho 46-6024
6752	Beedee	Beacon x (Hawkeye x Victoria)	Wisc. X436-2
7196**	--	Beacon x (Hawkeye x Victoria)	Wisc. X436-7
6930	Bentland	Benton <sup>7</sup> x Landhafer	Purdue 5129
3910**	Benton	D69 x Bond	Iowa 1263-1
7262	Binder	Selection Carsten III	Netherlands
5401**	Bondvic	(Anthony x Bond) x Boone	Iowa 45-4089-3

Table 1. (Continued)

C.I. No.	Name	Parentage or history	Source and/or selection number
7563	Bonkee	Bonham <sup>5</sup> x (Cherokee <sup>2</sup> x R.L. 2105)	Iowa C648
3305**	Boone	Victoria x Richland	Iowa 35-509
5013	Branch	(Forward x Victoria-Richland) x Forward	Wisc. X304-4
7690*	Brave	Putnam [(Landhafer x (Mindo x Hj-Jt))] x Andrew[]	Ill. 58-1951
6571**	Bronco	(Lee x Victoria) x Fulwin	Tex. 3770-7
6537	Burnett	(Victoria x Hajira-Banner) x Colo	Iowa 49-2166
3846**	Cherokee	D69 x Bond	Iowa 35-2064-1
5647	Clarion	Clinton x Marion	USDA-Iowa B-194-9-3001
5869	Clintafe	Clinton <sup>3</sup> x Santa Fe	Iowa 117-1 Abd. 93
7463	Clintford	(Clinton 59 <sup>7</sup> x Landhafer) x Milford	Purdue 5328A3-4P-2
7234	Clintland 60	Clintland x [(Ctn x Boone-Cartier) x R.L. 2105]	Purdue 5413
7639	Clintland 64	(Clintland <sup>5</sup> x LMHJA) x (Cld x Ctn <sup>6</sup> -GA)	Purdue 5877
3971	Clinton	D69 x Bond	Iowa 1335-3
4532	Clinton Resel.	D69 x Bond	Iowa 1335-3-1
7684	Coachman	Marne <sup>2</sup> x [(Beaver x Garry-Clinton) x Clintland]	Mich. 56-30-1439
3916	Cody	(Victoria x Richland) x Bannock	USDA-Idaho 37-1107
3972	Colo	Hancock x (Morota x Bond)	Iowa 35-1612
5332	Craig	Ithacan x Victoria	N.Y. 526a1-14-9-9-77
7269	Dodge	Clintland x (Garry x Hawkeye-Victoria)	Wisc. X643-9
4672	Dupree	(Anthony x Bond) x (Richland x Fulghum)	Kans. 41665
6916	Fayette	Vicland x (Branch x Clinton <sup>2</sup> -Santa Fe)	Wisc. X486-4
6588	Floriland	Florida 167 x Landhafer	Fla. Bulk 25
3697	Fulgrain	Big Boy x Navarro	Coker Sel.
7288	Fundy	Ajax x Abegweit	C.A.N. 822
7453	Garland	Clintland x (Garry x Hawkeye-Victoria)	Wisc. X643-41
6662	Garry	Victory x (Victoria x Hajira-Banner)	R.L. 1692-27
7266*	Goodfield	Clintland x (Garry x Hawkeye-Victoria)	Wisc. X643-2
2027	Gopher	Selection from Sixty Day	Minn. 674
7989*	Harmon	[(Vtra x Hj-Bnr) x Roxton] x Beacon[] x Rodney	Can.I.H. 5880-52-3-2



Table 1. (Continued)

C. I. No.	Name	Parentage or history	Source and/or selection number
3756**	Huron	Markton x Victory	Mich. 5210
5441	Jackson	Clinton x Marion	USDA-Mich. B-196-3006
3522	Landhafer	Introduced from Uruguay	Uruguay 1675
5628	LaSalle	Marion x Clinton	Ill. 43-262
7561*	Lodi	(Richland x Bond) x (Garry x Hawkeye-Victoria)	Wisc. X697-2
6929	Logan	Benton x Marion	Ill. 47-108
6625	Macon	Columbia x Marion	Mo. 04346
3247**	Marion	Markton x Rainbow	USDA-Iowa 708-3
2053**	Markton	Selection from unnamed Turkish variety	Oreg. 357-1
2597**	Marvic	Markton x Victory	Idaho 4837
6913	Minhafer	(Bond-Rainbow x Hajira-Joanette) x Landhafer	Minn. II-47-25
6765	Minland	Landhafer x (Mindo x Hajira-Joanette)	Minn. II-46-3
6935**	Minton	Landhafer x (Mindo x Hajira-Joanette)	Minn. II-50-12
2588	Mission	Markton x Victory	Idaho 4827
4327	Mohawk	Bond x D67	Iowa 1307-9
4988**	Mo. 0-205	Columbia x (Victoria x Richland)	Mo. 04205
4660	Mustang	(Lee x Victoria) x Fulwin	Tex 3770-9
966	Navarro	Selected from unknown Texas variety	Farmer selection
4301*	Nemaha	(Victoria x Richland) x (Morota x Bond)	Iowa 37-20-2-82-1-10
7194	Nehawka	Cherokee Reselection	Nebr. 52753
4141**	Neosho	(Fulghum x Markton) x (Victoria x Richland)	Kans. 393620
6642	Newton	Nemaha x (Clinton x Boone-Cartier)	Purdue 436A2-2-4-1
7528	Niagara	Garry x [(Goldwin x Victoria-Rainbow) x Branch]	N.Y. 5220a2-2B-23
7272*	Nodaway	(Columbia x Marion) x R.L. 2105	Mo. 04635
7458	Oneida	Goldwin x (Victoria x Rainbow)	N.Y. 618a1-1-2-12
7399	Opala	[(Bond-Rainbow x Hj-Jt) x Landhafer] x Andrew	Minn. II-52-3
7811	Orbit	Alamo x [Garry Sel. 5 x (Goldwin x Vtra-Rainbow)]	N.Y. 5279a1B-3B-70
7473	Ortley	[Garry x (Santa Fe x R.L. 1942)] x R.L. 2228	S.D. RRO II B58-3-4
4181**	Overland	(Victoria x Richland) x Bannock	Idaho 40-2208

Table 1. (Continued)

C.I. No.	Name	Parentage or history	Source and/or selection number
6927	Putnam	(Boone x Cartier) x Clinton	Purdue 424A1-71-5-9
7531*	Putnam 61	Putnam <sup>4</sup> x [(Landhafer x (Mindo x Hj-Jt))] x And[]	Purdue 5638G-1-5
5927	Ransom	Sac x (Hajira x Joannette)	Iowa 94-78-8-1
3733**	Rangler	Nortex x Victoria	USDA-Tex.Ar1. 39-238
6661	Rodney	(Victoria x Hajira-Banner) x Roxton	R.L. 2123
7557	Russell	(Garry x Ukraine) x Abegweit <sup>2</sup>	Ottawa 5055-46
4639**	Saia	Selection from <u>Avena strigosa</u>	Brazil 1469
7454	Santee	Clinton x [(Victoria x Hajira-Banner) x Victory]	Nebr. 521451
5946	Sauk	(Forward x Victoria-Richland) x Andrew	Wisc. X345-1
5924**	Seminole	Appler x (Clinton <sup>2</sup> x Santa Fe)	Fla. 6514
3976**	Shasta	Markton x Victory	Mont. 2599-4
4372	Shelby	Anthony x Bond	Iowa 36-1112-7-9
7209*	Shield	[Rxt x (Vtra x Hj-Bnr)] x Aj x (Vtra x Hj-Bnr)]	Ottawa 3928-K-2-2
6767	Simcoe	Ajax x Erban	R.L. 1114
5207	Southland	(D69 x Bond) x Fultex	Fla. XM4111-1-13
3855*	Stanton	Lee x Victoria	Coker 40-5
8170*	Stormont	Shield x (Garry x Klein)	Can. O.A. 34-8
6600	Sunland	Fulghum x Landhafer	Fla. 12506
6908*	--	(Arlington x Delair) x Trispernia	Coker 53-29
7524	Tioga	Garry x (Goldwin x Clinton)	N.Y. 5217a1-2B-39
7680	Tippecanoe	Clintonland 60 <sup>2</sup> x Mo. 0-205	Purdue 5414I3-39-2
4009	Trispernia	Introduced from Roumania	Roumania
7679	Tyler	Clintonland 60 <sup>2</sup> x Mo. 0-205	Purdue 5414I3-8-1
5440	Waubay	Clinton x Marion	Iowa B-173-2850
7476	Zanster	Adelaar x Dippe's Early White	Holland
4800	Zephyr	Bond x Anthony	Minn. 861

1/ C.I. refers to accession number of Cereal Crops Research Branch, CR, ARS.

\*Free from infection with incomplete set of races; \*\*free from infection with all 23 races.

Table 2. Reaction of oat varieties to 23 pathogenic races of loose and covered smut at Pullman, Wash.

C.I. No.	Variety	Avenae races															Kolleri races							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	"576"	1	2	3	4	5	6	7
<u>Differential varieties:</u>																								
2143	Anthony	95	77	78	71	95	60	72	95	44	68	95	0	0	28	0	84	76	72	71	18	71	70	45
4599	Atlantic	0	0	3	0	0	3	4	0	0	0	0	7	1	91	85	0	0	0	0	0	0	0	100
1878	Black Diamond	84	37	58	39	74	22	43	51	26	0	0	24	0	23	34	9	1	72	28	18	1	36	5
1877	Black Mesdag	0	0	0	64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	0	0
2965	Camas	0	88	0	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6701	Clintland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	0	0	0	0	0	0	0
708	Fulghum	0	0	0	0	3	0	0	0	30	0	0	23	0	4	18	3	1	0	0	17	0	5	0
1898	Gothland	0	0	39	0	95	28	45	0	33	18	30	0	0	0	15	67	0	0	77	0	0	0	10
1876	Monarch	0	0	90	93	0	54	65	0	0	0	0	0	72	0	12	0	0	95	0	82	82	0	0
560	Victory	81	60	22	48	74	12	13	80	0	7	47	0	0	0	0	48	31	27	15	0	10	0	5
<u>Agronomic varieties:</u>																								
5371	Alamo	0	0	0	0	0	0	0	0	0	0	0	0	0	33	58	0	2	0	0	0	0	0	57
4170	Andrew	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	8	0	0	0	0	0	0	0
5967	And x Clinton	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4657	Arlington	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	2	0	0	0	0	20
7670	AuSable	- 19	- 27	-	-	-	- 24	-	- 11	-	-	-	-	-	41	- 30	-	-	-	-	-	-	-	-
5346	Basin	- 0	- 0	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
6752	Beedee	0	0	0	0	0	0	0	0	0	1	0	0	0	71	66	0	0	0	0	0	0	0	75
7196	Bcn x(Hwk xVtra)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6930	Bentland	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3910	Benton	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7262	Binder	- 80	- 12	-	-	-	- 47	-	-	-	-	-	-	-	7	- 44	-	-	-	-	-	-	-	-
5401	Bondvic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 2. (Continued)

C.I. No.	Variety	Avenae races															Kolleri races							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	"576"	1	2	3	4	5	6	7
7563	Bonkee	-	9	-	0	-	-	0	-	-	-	-	-	-	0	-	28	-	-	-	-	-	-	-
3305	Boone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5013	Branch	0	0	0	0	0	0	0	0	0	0	0	0	0	15	34	-	0	0	0	0	0	0	43
7690	Brave	-	0	-	0	-	0	-	0	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-
6571	Bronco	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6537	Burnett	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0
3846	Cherokee	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5647	Clarion	0	0	0	0	0	10	0	0	0	T	0	0	0	0	0	0	0	0	0	0	0	0	0
5869	Clintafe	0	T	T	T	1	T	4	0	0	8	2	0	0	1	1	56	1	1	0	0	1	3	0
7463	Clintford	-	3	-	10	-	36	-	13	-	-	-	-	-	12	-	28	-	-	-	-	-	-	-
7234	Clintland 60	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
7639	Clintland 64	-	0	-	0	-	0	-	0	-	-	-	-	-	0	-	13	-	-	-	-	-	-	-
3971	Clinton	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41	0	0	0	0	0	0	0
4532	Clinton Resel.	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	23	0	0	0	0	0	0	0
7684	Coachman	-	12	-	18	-	0	-	0	-	-	-	-	-	12	-	26	-	-	-	-	-	-	-
3916	Cody	0	0	0	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3972	Colo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
5332	Craig	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	3
7269	Dodge	-	0	-	8	-	4	-	2	-	-	-	-	-	-	-	63	-	-	-	-	-	-	-
4672	Dupree	0	0	0	0	2	0	1	0	0	1	1	0	0	1	1	0	0	0	0	0	1	1	1
6916	Fayette	0	0	0	0	0	0	0	0	0	0	2	0	0	23	11	50	0	0	0	0	0	0	22
6588	Floriland	0	0	0	0	0	0	0	2	0	2	4	0	0	0	46	0	0	0	0	0	0	0	0
3697	Fulgrain	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0
7288	Fundy	2	1	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
7453	Garland	0	0	0	1	1	0	0	0	9	0	0	0	0	0	0	12	0	0	0	0	0	0	0
6662	Garry	0	0	0	0	0	0	0	0	0	0	0	0	0	18	0	0	0	0	0	0	0	0	12
7266	Goodfield	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
2027	Gopher	-	0	-	10	-	16	-	2	-	-	-	-	-	17	-	80	-	-	-	-	-	-	-
7989	Harmon	-	0	-	0	-	0	-	0	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-



Table 2. (Continued)

C.I. No.	Variety	Avenae races															Kolleri races							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	"576"	1	2	3	4	5	6	7
3756	Huron	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5441	Jackson	3	14	4	4	5	8	18	3	5	3	T	3	3	4	6	-	6	5	5	13	4	4	3
3522	Landhafer	0	0	3	8	9	9	10	0	8	3	12	3	0	2	5	10	6	12	16	1	0	7	4
5628	LaSalle	0	0	4	0	0	0	14	1	7	8	5	5	1	0	5	5	0	0	0	0	0	3	0
7561	Lodi	-	0	-	0	-	0	-	0	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-
6929	Logan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	65	0	0	0	0	0	0	0
6625	Macon	10	0	9	9	1	0	19	11	0	27	20	7	2	11	4	0	2	8	5	8	0	3	1
3247	Marion	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2053	Markton	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2597	Marvic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6913	Minhafer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	94	0	0	0	0	0	0	0
6765	Minland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0
6935	Minton	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2588	Mission	0	0	0	0	0	0	0	0	0	0	4	2	0	0	0	0	0	0	0	0	0	0	0
4327	Mohawk	0	0	1	1	0	2	3	3	2	5	0	0	0	2	1	39	1	1	0	1	0	1	1
4988	Mo. 0-205	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4660	Mustang	0	0	0	0	30	22	0	0	0	0	30	0	0	0	0	90	0	0	13	0	0	0	0
966	Navarro	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0
4301	Nemaha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
7194	Nehawka	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
4141	Neosho	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6642	Newton	6	6	0	3	2	12	0	0	0	10	2	0	0	95	90	0	9	0	6	0	0	0	95
7528	Niagara	-	0	-	0	-	-	0	-	0	-	-	-	-	33	-	0	-	-	-	-	-	-	-
7272	Nodaway	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
7458	Oneida	-	0	-	4	-	-	0	-	0	-	-	-	-	0	2	-	-	-	-	-	-	-	-
7399	Opala	1	2	0	0	0	0	0	2	4	0	2	0	1	0	5	-	0	2	0	1	1	-	1
7811	Orbit	-	0	-	0	-	-	0	-	0	-	-	-	-	30	-	0	-	-	-	-	-	-	-
7473	Ortley	-	0	-	0	-	-	0	-	0	-	-	-	-	32	-	0	-	-	-	-	-	-	-
4181	Overland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Table 2.- (Continued)

C.I. No.	Variety	Avenae races															Kolleri races							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	"576"	1	2	3	4	5	6	7
6927	Putnam	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	3	0	0	0	0	0	0	0
7531	Putnam 61	-	0	-	0	-	0	-	0	-	-	-	-	-	0	-	0	-	-	-	-	-	-	-
5927	Ransom	48	14	24	14	21	11	21	14	15	28	19	20	22	20	11	0	0	6	2	2	2	6	1
3733	Rangler	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6661	Rodney	1	1	0	0	1	0	0	1	0	0	1	0	0	25	1	0	0	1	0	0	0	0	15
7557	Russell	-	0	-	0	-	0	-	0	-	-	-	-	-	6	-	0	-	-	-	-	-	-	-
4639	Saia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7454	Santee	0	0	3	5	3	4	27	0	4	17	5	0	0	6	3	28	0	0	0	0	2	20	0
5946	Sauk	0	0	5	3	1	1	13	0	1	12	83	0	0	2	0	46	1	5	0	0	0	0	1
5924	Seminole	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3976	Shasta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4372	Shelby	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
7209	Shield	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
6767	Simcoe	19	32	9	2	36	28	14	24	2	16	69	1	0	1	0	42	18	29	5	0	1	11	1
5207	Southland	0	0	0	0	0	0	0	0	0	0	0	0	0	5	79	0	0	0	0	0	0	0	5
3855	Stanton	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
8170	Stormont	-	0	-	0	-	0	-	0	0	0	-	-	-	0	-	-	-	-	-	-	-	-	-
6600	Sunland	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
6908	(Arl x Dlr) x Ts	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
7524	Tioga	-	0	-	0	-	0	-	0	-	0	-	-	-	11	-	0	-	-	-	-	-	-	-
7680	Tippecanoe	-	0	-	7	-	-	9	-	3	-	-	-	-	9	-	80	-	-	-	-	-	-	-
4009	Trispermia	4	2	3	2	5	0	4	3	0	0	1	0	0	1	0	0	2	5	3	0	3	0	2
7679	Tyler	-	0	-	18	-	-	34	-	12	-	-	-	-	24	-	90	-	-	-	-	-	-	-
5440	Waubay	1	0	1	1	0	1	8	1	0	9	5	1	0	0	1	0	0	0	0	0	0	1	1
7476	Zanster	-	33	-	7	-	-	40	-	23	-	-	-	-	13	-	8	-	-	-	-	-	-	-
4800	Zephyr	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	7	0	0	0